

**Sea Engineering, Inc.**

Makai Research Pier
41-305 Kalanianaʻole Hwy.
Waimanalo, Hawaii 96795-1820
Ph: (808) 259-7966 Fax: (808) 259-8143
Email: sei@seaengineering.com
Website: www.seaengineering.com

MEMORANDUM

DATE:	8/29/17	
TO:	(b) (6)	
FROM:		
SUBJECT:	Puuloa Range Training Facility Shoreline Change	

The Federal Department of the Army Permit and State of Hawaii Section 401 Water Quality Certification, which authorized the excavation and placement of fill in coastal waters to construct the Iroquois Point Beach Nourishment and Stabilization Project, require long term monitoring of the beach performance. The beach monitoring is accomplished primarily by surveying beach profiles at selected locations along the shoreline. Five of these profiles are located between the western-most groin and Ewa Beach Park, located at approximate 1,000 intervals, with three of them along the Range shoreline (see Figure 1). To-date a pre-construction survey (April 2, 2013) and six post-construction surveys have been accomplished, the most recent done on August 8, 2017 (the 4-Year post-construction survey).

A summary of the beach change in the vicinity of the Range is shown on Figure 2, which tabulates and graphs the 5-foot contour position on the beach face over time. The pre-construction profile (4/2/2013) position is the baseline position, or “0.0”, and movement seaward and landward (-) of the baseline is presented in feet.

200-W (200 feet west of the groin) – The shoreline steadily moved seaward through the 3-Year survey, widening about 50 feet, and then at the time of the 4-Year survey it had receded about half of the gain. The reason for the loss between Years 3 and 4 is not known, except that it was noted that the beach was unusually steep at the time of the survey, which might be attributable to very high tides and elevated water levels during the summer, which allows more wave energy to reach the beach.

1000-W (between Ranges E&F) – This profile slowly moved seaward through Year 3, gaining 25 feet, and then lost 6 feet of this gain between Years 3 and 4. However it is still 19 feet seaward of the pre-construction position. This increase in beach width is attributable to the blocking of sand transport by the western-most groin and the resultant up-stream trapping of sand.

2000-W (east side of range B) – This profile shows virtually no change from the pre-construction beach position.

3000-W (middle of Range A) – This profile steadily moved landward for the first two years post-construction, receding up to 28 feet, but has since remained nearly unchanged for the past two years (6/16/2015 – 8/8/2017).

4000-W (Ewa Beach Park) – This profile steadily receded landward for the first two years post-construction, moving 30 feet landward by June 2015, however by the end of Year 3 it had regained about 7 feet of this loss and then was little changed at the end of Year 4.

In summary, the shoreline along the eastern half of the range has moved seaward or remained unchanged during the 4 years post-construction, while the western half moved landward for the first two years and then has shown little change the last two years.

To-date the beach monitoring has been done annually, however following Year 4 the monitoring will be done every two years. Thus the next beach surveys will be done mid-2019.

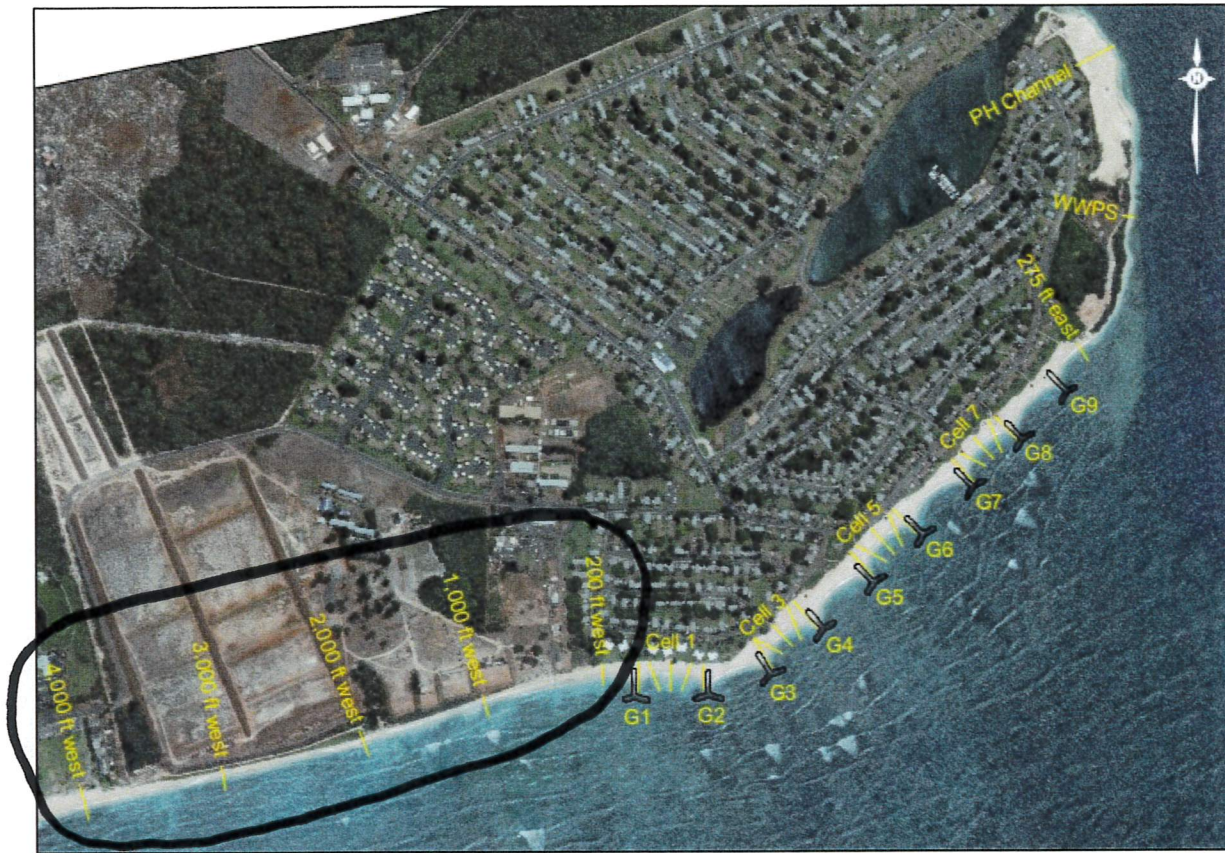


Figure 1 Overview of project site and monitoring stations (July 5, 2013 satellite image)

DATE	200-W POSITION	1000-W POSITION	2000-W POSITION	3000-W POSITION	4000-W (Ewa Beach Park) POSITION
4/2/2013	47.7	0.0	37.1	0.0	65.7
6/14/2013	64.4	16.7	41.0	3.9	68.1
11/5/2013	58.7	11.0	44.3	7.2	69.3
6/4/2014	76.4	28.7	45.6	8.5	70.6
6/16/2015	98.4	50.7	54.7	17.6	68.8
7/6/2016	93.5	45.8	61.9	24.8	69.0
8/8/2017	70.2	22.5	55.9	18.8	64.5

Puuloa Firing Range Profiles
5-foot Contour Position vs. Time

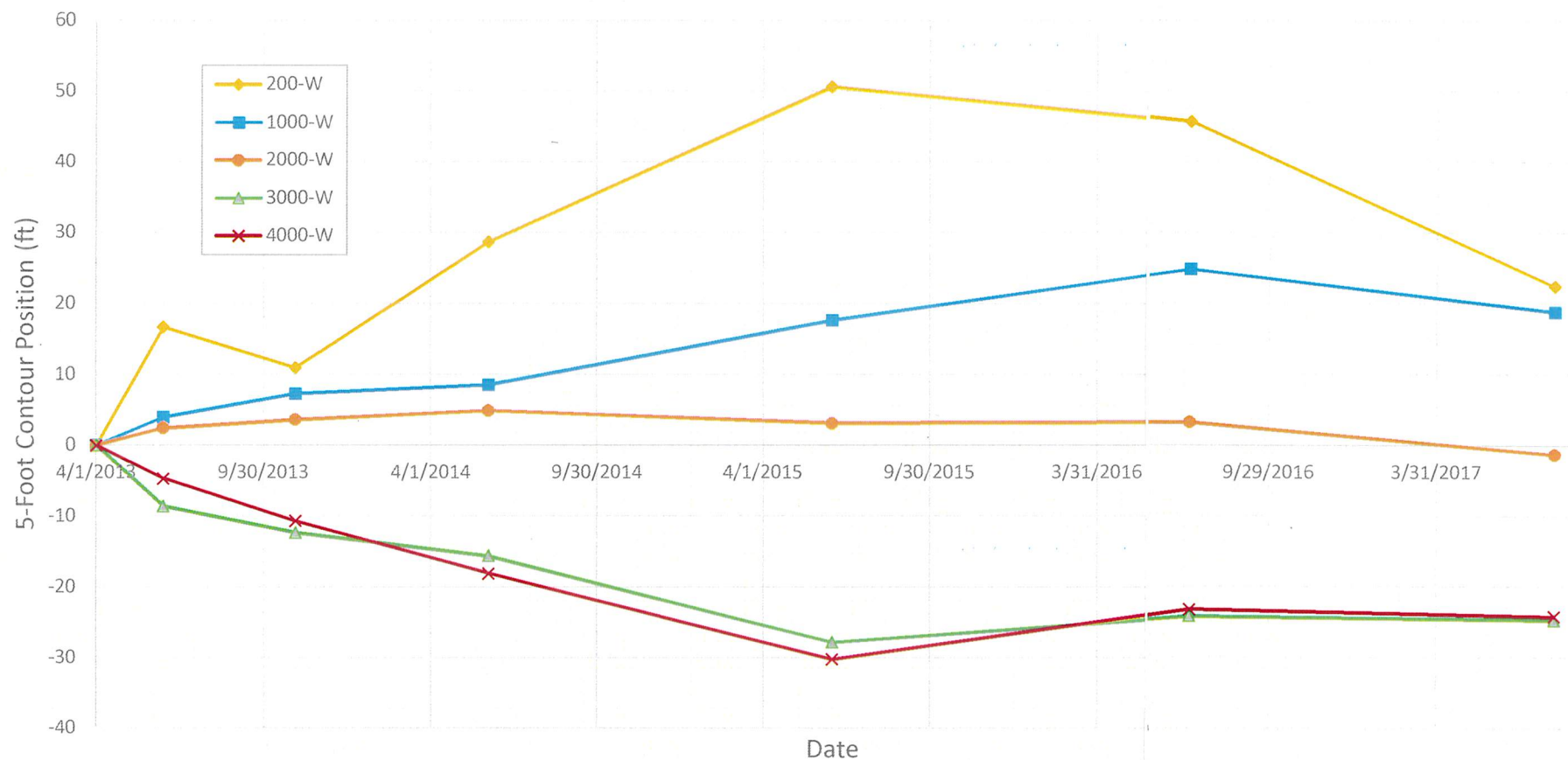


FIGURE 2. Summary of beach change

West Profiles

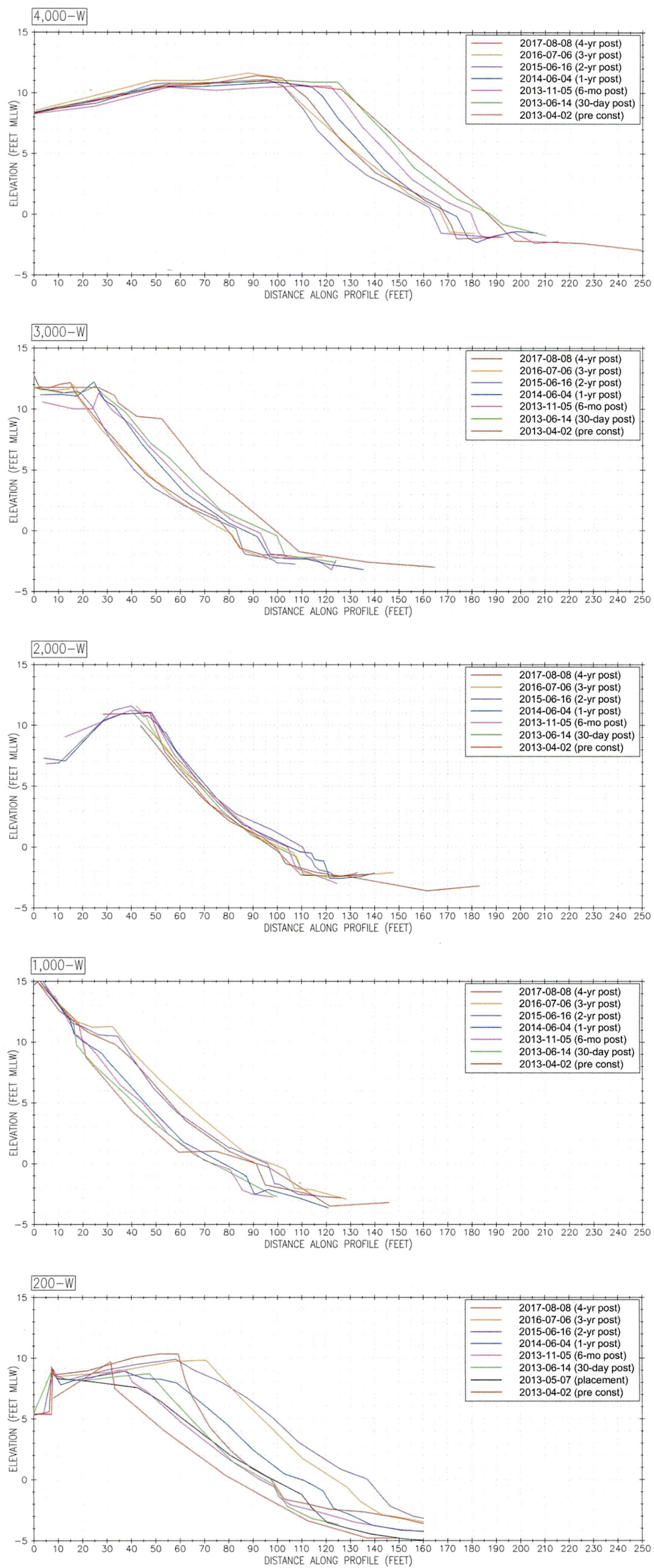


Figure 23 Measured profiles for locations west of project site